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ABSTRACT

This study was conducted to test the effect of learning styles and instructional advisement on subjects' achievement test performance, frequency in viewing embedded, elaborated information, time on task, and frequency in receiving instructional advisement in a hypermedia instructional system. In the first of two sessions, a screening test was administered to assess the students' knowledge of the instructional topic to be covered, i.e., DNA and protein synthesis, and a learning style test was administered to determine the group assignment. In the second session, subjects were taught the topic using a hypermedia instructional program, and an achievement test was administered, as well as a survey of their attitudes toward the instruction and the hypermedia system. The experiment was a posttest-only control group design. The results of the study indicated that achievement test scores, time on task, and selection frequency in viewing embedded information were affected by the interaction of learning style and instructional strategy for neutral-learning subjects. Those who received the advisory version performed better, spent more time on task, and chose to view more information than neutral-learning subjects using the nonadvisory version. Passive-learning subjects who received the advisory version scored significantly higher on their achievement test than passive-learning subjects who had the nonadvisory version. The results of comparisons between active-learning and passive-learning subjects found that active learners spent significantly more time on task; chose to view embedded information significantly more often than passive learners; and tended to score higher on the achievement test. (BBM)

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EFFECTS OF LEARNING STYLE IN A HYPERMEDIA INSTRUCTIONAL SYSTEM

by

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Background

The development of hypermedia technologies has led to a great anticipation of applications in education. A hypermedia system can (1) support fast navigation and linkage of related information for associative learning, (2) represent multimedia elaborated information of various forms, (3) update information easily, and (4) provide a high degree of freedom for learners to select and to sequence information. However, current interest in the educational possibilities of hypermedia has focused mainly on the systems implementation and software development. Little attention has been paid to the complexity of the interaction of design strategies and learners' characteristics in the educational applications of these capabilities.

The most often mentioned capability of hypermedia systems is the provision of a high level of freedom for learners to navigate, to select, and to link related information of different forms. To accomplish these browsing, selecting, and linking processes in order to view related information, users usually have to point the mouse or any other input device on the marked text or a graphical icon called button and click on it; then the related information will be shown. The underlying assumption is that learners will actively choose to see more related information to form a knowledge base on a topic. Additionally learners will make use of the related information in conjunction with their own previous knowledge to enrich their knowledge base. This assumption requires further study. When learning in a hypermedia system, will learners actively use linking capabilities to seek related information or passively accept whatever they are given? If learners act differently, what factors contribute to the learning style variations? Will the frequency of interactivity decrease as the instructional time increases?

Research Questions

The study was conducted to answer the following questions regarding learning in hypermedia instructional systems.

1. Are there differences among subjects of different learning styles on:
   a. performance tests scores?
   b. time on task?
   c. selection frequency in viewing embedded elaborated information?
   d. attitudes toward the hypermedia system?
   e. acceptance of instructional advisement?

2. What effect does instructional strategy have on subjects of different learning styles on:
   a. performance tests scores?
   b. time on task?
   c. selection frequency in viewing embedded elaborated information?
   d. attitudes toward the hypermedia system?

3. Are there interaction effects of learning style and instructional strategy on:
   a. performance tests scores?

b. time on task?
c. selection frequency in viewing embedded elaborated information?
d. attitudes toward the hypermedia system?

Methods

This study was conducted to test the effect of learning styles and instructional advisement on subjects' achievement test performance, frequency in viewing embedded information, time on task, and frequency in receiving instructional advisement in a hypermedia instructional system. A survey on subjects' attitudes toward the instruction and the hypermedia system was conducted after the experiment was completed.

This was a two-session study with three weeks interval in between sessions. In Session One, a screening test on DNA and protein synthesis was administered to participants in order to assess their knowledge on the instructional topic to be covered. Participants who performed 80% or above mastery level on the topic were eliminated from the subsequent study. A learning style test was also administered to participants in the first session of the study in order to determine the group assignment. In Session Two, subjects were taught the topic using a hypermedia instructional program; then an achievement test was administered. A survey of their attitudes toward hypermedia and the subject matter also was conducted after they had finished the achievement test.

The learning styles of interest in this study were (1) passive, (2) neutral,and (3) active approaches toward learning which was determined by performance on the Passive Active Learning Scale Test (PALS), a 32-item inventory which was constructed for this study by the experimenter to measure learning characteristics of different learners.

The instructional strategy implemented in this study was (1) with and (2) without advisement at the end of each instructional segment. For those subjects who received the advisory version treatment, the instructional program monitored their interaction with the subject matter along the instructional segments and provided advisement to view key information at the end of each segment, if needed. The other treatment did not provide for any advisement, and served as control condition.

The experiment was a posttest-only control group design. Two experimental variables were arranged in a 3 x 2 factorial design. The first independent variable, type of learning style, consisted of (1) active-learning style, (2) neutral-learning style, and (3) passive-learning style. The second independent variable, instructional strategy, consisted of (1) advisory instructional strategy (experimental) and (2) nonadvisory instructional strategy (control). The five categories of dependent variables were (1) performance tests scores, (2) time on task, (3) selection frequency in viewing embedded elaborated information, (4) attitudes toward the hypermedia system and the instructional material, and (5) frequency of receiving instructional advisement.

Results

The results of this study indicated that achievement test scores, time on task, and selection frequency in viewing embedded elaborated information were affected by the interaction of learning style and instructional strategy for neutral-

learning subjects. Those who received the advisory version performed better, spent more time on task, and chose to view more embedded elaborated information than neutral-learning subjects who received the nonadvisory version. Passive-learning subjects who received the advisory version scored significantly higher on their achievement test than passive-learning subjects who had the nonadvisory version.

The results of comparisons between active-learning and passive-learning subjects found there were significant group differences in the dependent variables of overall time on task and selection frequency in viewing embedded elaborated information, with active learners spending more time on task and choosing to view embedded elaborated information more often than passive learners. There was a trend toward a difference between these two groups in achievement test scores, with the active-learning group scoring higher.

Educational Implications

The results of this study indicated that learning style is a factor when the instruction is presented with a hypermedia system. This finding suggests the following practical applications in education:

1. Teachers should be encouraged to assess learning styles of their students in order to design instructional strategies for optimal learning,

2. The design and development of hypermedia programs should consider a student's learning style and be flexible. Instructional programs should be easily manipulated for presentation of material. With today's technology and computer hardware, these capabilities are within reach for educators to utilize for their students.